Toledo, Ohio, Site

U.S. DEPARTMENT OF ENERGY | Legacy Management

SITE CERTIFICATION SUMMARY

This Site Certification Summary provides information about the **Toledo, Ohio, Site**. The U.S. Department of Energy Office of Legacy Management is responsible for long-term stewardship of the site under the **Formerly Utilized Sites Remedial Action Program**.

Site Description and History

The Toledo, Ohio, Site (formerly known as the Baker Brothers site) consists of several buildings and grounds located at the intersection of Harleau Place and Post Street in Toledo, Ohio. During the early and mid-1940s, Baker Brothers, Inc. machined natural uranium metal slugs from processed uranium metals, under subcontract to the Manhattan Engineer District (MED), for both Clinton Semi-Works in east Tennessee and the Hanford nuclear reactor complex in Washington. After the MED subcontract ended in 1944, the Baker Brothers property was decontaminated and determined to comply with guidelines in effect at the time. Baker Brothers liquidated its assets, auctioned off its machinery and equipment, and divided and sold the property to two independent buyers.

In 1989, Oak Ridge National Laboratory (ORNL) conducted the preliminary site survey. The survey revealed localized areas of residual uranium contamination above applicable guidelines. Consequently, the Baker Brothers property was resurveyed in June 1990 and recommended for inclusion in the Formerly Utilized Sites Remedial Action Program (FUSRAP).

The northern part of the property was resold in the summer of 1992. The new owner of this portion of the property contacted ORNL and inquired about the radiological status of his property. ORNL learned that potentially contaminated soil and debris had been moved to 4400 Piehl Road in Ottawa Lake, Michigan, for use as fill material. A 1992 ORNL radiological investigation confirmed this. This residential property was then added to FUSRAP as a vicinity property of the former Baker Brothers site.

See the Site Overview Map on page 6 for more details about the site.

Site Remediation Timeline

1989 — ORNL conducted a radiological scanning survey of the Baker Brothers property.

June 1990 — ORNL resurveyed the Baker Brothers property and recommended the property for inclusion in FUSRAP.

September 20 and 21, 1992 — ORNL conducted a radiological survey of 4400 Piehl Road, Ottawa Lake, Michigan, at the request of the U.S. Department of Energy (DOE).

September 25, 1992 — The Baker Brothers property was designated for remedial action under FUSRAP. The Ottawa Lake property was subsequently added to FUSRAP as a vicinity property to the Baker Brother site.

October 1994 through January 1995 — DOE remediated the Ottawa Lake vicinity property.

April through September 1995 — DOE remediated the Toledo, Ohio, Site.

August 27, 2001 — DOE published a notice of cleanup certification for the site in the Federal Register.

Certification Docket Contents

The Certification Docket documents the successful decontamination of radioactively contaminated areas at the former Baker Brothers, Inc. site in Toledo, Ohio, and associated vicinity property in Ottawa Lake, Michigan. The docket includes documents supporting certification that conditions at the subject properties comply with radiological guidelines in effect at the time of remediation. In addition, the certification docket substantiates that the future use of the properties will not produce any significant radiological hazard or dose to the general public as a result of residual radioactivity remaining on-site that originated during activities conducted by the DOE or predecessor agencies.

Remedial Action

As part of FUSRAP, DOE remediated the Toledo site from April to September 1995 and the Ottawa Lake vicinity property from October 1994 to January 1995. See the Fact Sheet for more details about the remediation.

FUSRAP objectives for the sites were to:

- Identify and evaluate sites used to support nuclear development activities for the U.S. Army Corps of Engineers, MED, and the U.S. Atomic Energy Commission, all of which were predecessor agencies of DOE.
- Remove or otherwise control contamination at sites identified as contaminated above current DOE guidelines.
- Achieve and maintain compliance with applicable criteria for the protection of human health and the environment.
- Certify each site, to the extent practicable, for appropriate future use without radiological restrictions.

Post-Remediation Sampling

Post-remediation survey techniques included measurements of direct and transferable surface contamination (where appropriate), walkover gamma scans, external gamma radiation exposure rate measurements, and soil sampling.

Baker Brothers Site

All survey results for direct and transferable surface contamination were below DOE guidelines. All external gamma radiation exposure rates were also below the DOE guideline, which specifies 20 microroentgen per hour (µR/h) above background as the maximum acceptable average exposure rate inside a building or habitable structure.

To confirm that all soils with residual radioactive contamination exceeding the site-specific cleanup criterion of 35 picocuries per gram (pCi/g) total uranium had been removed, soil samples were collected and analyzed for uranium-238 (U-238). For natural uranium (with abundant uranium isotopes), the total uranium concentration for a sample is approximately equal to double the U-238 concentration. Therefore, the site-specific cleanup criterion was 17.5 pCi/g of U-238.

See the Data Summary Worksheet on pages 3-5 for more details about the post-remediation sampling results.

Ottawa Lake Vicinity Property

Walkover gamma radiation surveys over the excavated areas and grounds verified the removal of all gamma-emitting contamination above DOE guidelines. Following these surveys, 25 equally spaced soil samples were collected from each 10-meter by 10-meter excavated area. Analytical results for samples from the excavated areas indicated that no contamination above the DOE guidelines and the site-specific total uranium concentration of 35 pCi/g remained.

See the Data Summary Worksheet for more details about the results from the post-remedial action sampling.

Current Site Conditions

The post-remedial action survey data indicated that all radiologically contaminated areas of the former Baker Brothers site and the Ottawa Lake vicinity property met applicable DOE guidelines for cleanup of residual radioactive contamination. Radiological conditions at the site comply with DOE decontamination criteria and standards to protect health, safety, and the environment, and DOE certified the site as appropriate for release and use without radiological restrictions. DOE has been responsible for long-term stewardship of the Toledo site since 2001. The stewardship requirements and protocols are captured in the FUSRAP Long-Term Surveillance and Maintenance Plan, which is available on the DOE Office of Legacy Management website (www.energy.gov/lm/toledo-ohio-site).

ADDITIONAL INFORMATION

Documents related to FUSRAP activities at the Toledo, Ohio, Site are available on the LM website at lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Toledo.

For other information on site history or current long-term stewardship activities, please contact us at:

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03/2023

Toledo, Ohio, Site Certification Data Summary Worksheet

Five tables referenced in the Toledo Certification Docket provide the evidence used to certify the site as clean.

When the tables refer to the "Certification Docket," that is the "Certification Docket for the Remedial Action Performed at the Former Baker Brothers, Inc., Site in Toledo, Ohio and the Ottawa Lake Vicinity Property in Ottawa Lake, Michigan" (dated September 2001).

Summary of Post-Remedial Action Radiological Survey of Direct and Transferable Radiation

Table I-4 in the Certification Docket

Room/Location	Direct Surface Contamination (above background)				Transferable Contamination (above background)[a]			
	Alpha		Beta/Gamma		Alpha		Beta/Gamma	
	Survey Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria[b]	Survey Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria[b]	Survey Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria[b]	Survey Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria[b]
South Building								
Area 5, eastern loft floor[c]	0 - 85	27/27	0 - 753	27/27	[a]	[a]	[a]	[a]
Area 5, eastern loft, east wall[c]	0 - 113	30/30	0 - 706	30/30	[a]	[a]	[a]	[a]
Area 5, western loft, floor (spot)	0 - 15	5/5	0 - 514	5/5	[a]	[a]	[a]	[a]
Area 5, northeastern corner ground floor (spot)	0 - 15	5/5	0	5/5	[a]	[a]	[a]	[a]
Area 3A, manhole cover[c]	0 - 50	4/4	0 - 447	4/4	0	2/2	0	2/2
Area 6-2A, floor[c]	0 - 169	81/81	0 - 3,287	81/81	0 - 5	17/17	0 - 48	17/17
North Building								
Area 7 - southern wall scar (generated by wall removal)	[d] - 40	19/19	84 - 1,431	19/19	d - 5	4/4	d - 25	4/4
Area 7A - northern wall	[d] - 397	68/68	[d] - 2,921	68/68	<0 - 5	20/20	d - <23	20/20
Area 8E - floor	[d] - 66	91/91	<353 - 1,563	91/91	<-1 - 8	33/33	d - 52	33/33
Area 8W - overhead structures	[d] - 106	519/519	[d] - 4,723	519/519	<-1 - 13	40/40	d - 66	40/40
Area 8W - walls	[d] - 128	168/168	[d] - 2,319	168/168	[d] - 5	55/55	d - 62	55/55
Area 8W - floor	[d] - 144	818/818	[d] - 4,320	818/818	[d] - 5	145/145	d - 67	145/145
Area 8W - pipe chase	[d] - 82	42/42	[d] - 3,805	46/46	[d] - 5	12/12	d - 87	12/12
Corridor, Toledo scale area	[d] - 89	161/161	[d] - 1,941	161/161	[d] - 5	50/50	d - 66	50/50
Courtyard								
Walls	[d] - 216	378/378	[d] - 2,160	378/378	[d] - 8	16/16	d - 66	16/16
Concrete pads, manholes	[d] - 298	290/290	[d] - 2,337	290/290	[d] - 5	43/43	d - 33	43/43
DOE Guidelines	5,000		5,000		1,000		1,000	

[a]A transferable measurement is taken only when the direct measurement exceeds 1,000 dpm/100 cm^2.
[b]A measurement that is below criteria is judged to be clean.
[c]The guidelines presented are extracted from DOE Order 5400.5, Radiation Protection of the Public and the Environment, and represent the average allowable surface residual contamination (over a 1-m^2 area).
[d]Indistinguishable from background.

Summary of Post-Remedial Action External Gamma Radiation Exposure Rates

Table I-5 in the Certification Docket

Room or Area	Exposure Rate (µR/h)	Number of Measurements	Number Exceeding Indoor Exposure Limit
Area 5	10.52	1	0
Area 6-2A	12.81	1	0
Area C excavation	10[a]	2	0
Area 7 excavation	10 - 12[a]	15	0
Courtyard	7 - 15[a]	62	0
Area 7A	9 - 13[a]	15	0
Area 8W	11 - 12[a]	8	0
Area 8E	10 - 12[a]	10	0
Corridor	11 - 12a	15	0
DOE Guideline	[b]		

[a]ORISE exposure rate measurements and samples.
[b]The guideline is extracted from DOE Order 5400.5, Radiation Protection of the Public and the Environment, which states that the average external gamma radiation exposure rate inside a building on a site that has no radiological restrictions on its use must not exceed the background level by more than 20 µR/h.

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Toledo, Ohio, Site Certification Data Summary Worksheet

Summary of Post-Remedial Action Soil Sampling Results				
Table I-6 in the Certification Docket				
Area	**Average Exposure Rate[a] (µR/h)**	**Uranium-238 Results (pCi/g)**	**Total Uranium (pCi/g)[a]**	**Number of Samples in Composite[b]**
Interior Areas of Excavation				
Area 7A	9 - 13[c]	<5.79	<11.58	32
Area 8W				
Southern expansion joint	11 - 12[c]	<1.67	<3.34	9
Northern expansion joint	11 - 12[c]	<1.53	<3.06	9
Corridor - expansion joint	11 - 12[c]	<2.15	<4.30	25
Exterior Areas of Excavation				
Area A - corner of Post Street and Harleau Place	9.1	10.51	21.02	6
Area B - Post Street along walkway	9.4	<3.29	<6.58	6
Area C - along northern property line, between North and East Buildings	10[c]	<4.64	<9.28	30
Area 7 - south of southern wall	10 - 12[c]	<2.81	<5.62	5
Courtyard	7 - 15[c]	12.08	24.16	8
Average Outdoor Background	8.27	1.04	2.08	N/A
Applicable guideline	[d]	(17.5 pCi/g)	35 pCi/g	N/A

[a]The site-specific guideline for residual uranium in soil is 35 pCi/g total uranium. Total uranium concentration can be estimated by doubling the uranium-238 concentration.
[b]Soil samples collected from each location were composited and analyzed as a single sample.
[c]ORISE exposure rate measurements and samples.
[d]The guideline is extracted from DOE Order 5400.5, Radiation Protection of the Public and the Environment, which states that the average external gamma radiation exposure rate inside a building on a site that has no radiological restrictions on its use shall not exceed the background level by more than 20 µR/h. For exterior areas, the DOE limit of 100 mrem/yr is applied and can be converted to 11 µR/h above background.
Note: The "<" sign indicates that the measurement is less than the minimum detectable activity (MDA).

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Toledo, Ohio, Site Certification Data Summary Worksheet

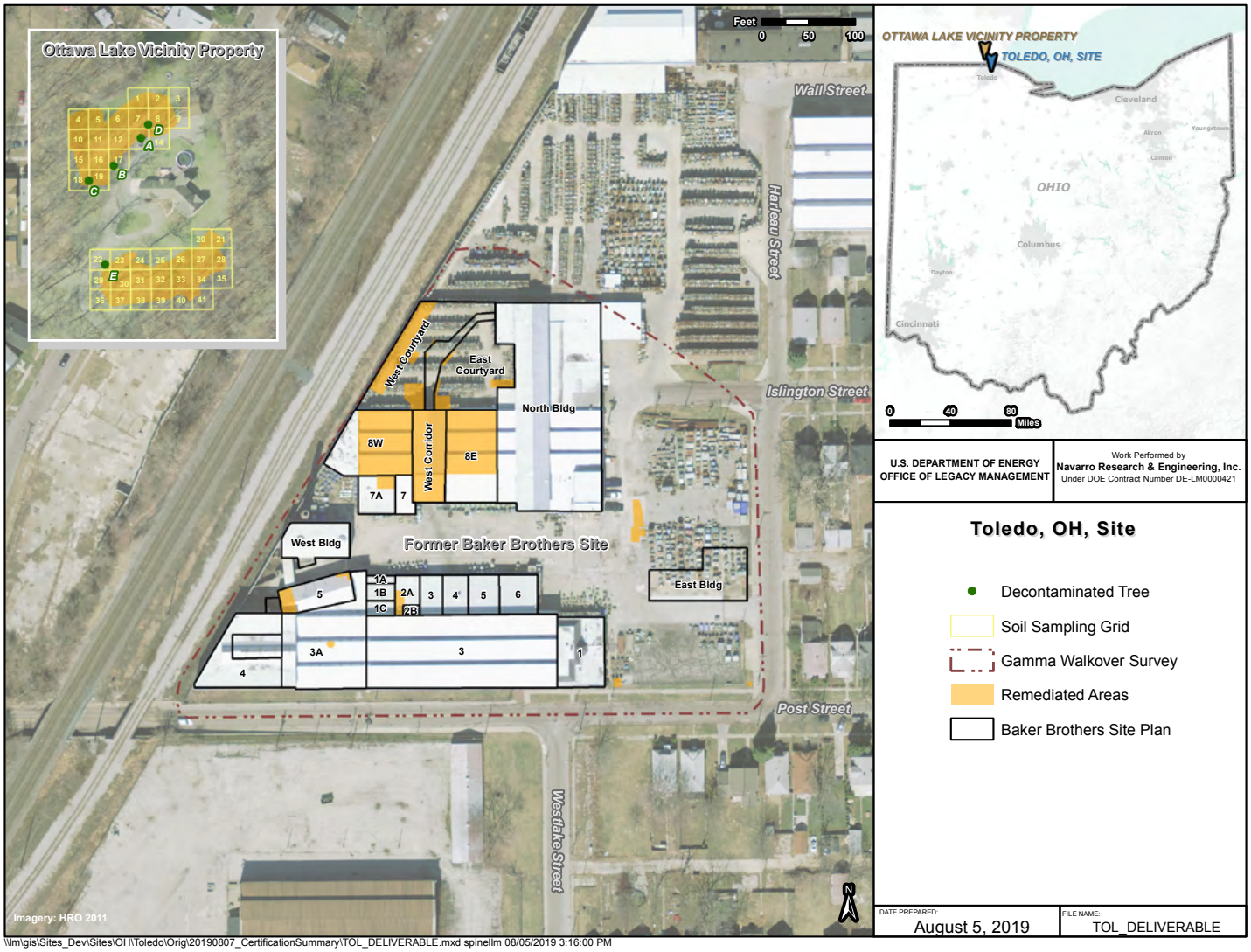
Summary of Post-Remedial Action Radiological Results for the Root Systems and Tree Bases at the Ottawa Lake Vicinity Property									
Table I-8 in the Certification Docket									
		Direct Surface Contamination[a]				Transferable Surface Contamination[a]			
		Alpha		Beta/Gamma		Alpha		Beta/Gamma	
Tree ID	General Location	Sample Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria	Sample Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria	Sample Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria	Sample Activity Range (dpm/100 cm^2)	Number of Measurements/ Number Below Criteria
A	Tree in Backyard at N155, E56	0 - 19	3/3	1,500 - 2,001	3/3	<1 - <2	3/3	0 - <51	3/3
B	Tree in Backyard at N144, E41	10 - 19	4/4	<300 - 650	4/4	<1 - 5	4/4	<20 - <61	4/4
C	Tree in Backyard at N122-123, E24-25	10 - 19	3/3	<375 - 1,125	3/3	<1 - 5	3/3	[b] - <57	3/3
D	Tree in Backyard at N159-161, E61-63	0 - 76	5/5	1,000 - 2,501	5/5	<1 - 14	5/5	<44 - 84	5/5
E	Roots on NW side of SCA	0 - 57	5/5	<375 - 2,626	5/5	<1 - 5	5/5	<24 - <34	5/5
DOE Guideline:		**5,000**		**5,000**		**1,000**		**1,000**	

[a]All results include background readings for the Ottawa Lake Region
[b]Indistinguishable from background.

Post-Remedial Action Soil Sample Results for the Ottawa Lake Vicinity Property			
Table I-9 in Certification Docket			
Grid Number	Grid Coordinates	Total Uranium[a] (pCi/g)	Gamma Exposure Ratea (µR/h)
1	N175, E55	10.4	6.9
2	N175, E65	6.0	6.6
3	N175, E75	7.2	6.9
4	N165, E25	10.6	6.9
5	N165, E35	14.0	6.8
6	N165, E45	14.0	6.5
7	N165, E55	15.0	7.3
8	N165, E65	14.8	6.8
9	N165, E75	13.8	6.9
10	N155, E25	10.4	6.9
11	N155, E35	14.8	6.6
12	N155, E45	15.8	6.6
13	N155, E55	20.0	7.0
14	N155, E65	33.8	7.5
15	N145, E25	5.2	6.5
16	N145, E35	9.4	6.8
17	N145, E45	9.2	7.2
18	N135, E25	7.2	6.8
19	N135, E35	7.8	6.6
20	N105, E85	8.4	7.1
21	N105, E95	9.2	7.2
22	N95, E35	5.2	6.8
23	N95, E45	3.2	6.6
24	N95, E55	2.4	6.5
25	N95, E65	7.0	7.4
26	N95, E75	10.4	7.3
27	N95, E85	6.4	7.1
28	N95, E95	11.2	7.2
29	N85, E35	5.0	6.8
30	N85, E45	3.0	6.6
31	N85, E55	14.0	6.6
32	N85, E65	15.6	6.8
33	N85, E75	17.0	7.4
34	N85, E85	9.2	7.2
35	N85, E95	9.4	6.7
36	N75, E35	9.8	6.7
37	N75, E45	8.4	6.6
38	N75, E55	9.0	6.8
39	N75, E65	2.8	7.1
40	N75, E75	6.0	7.5
41	N75, E85	8.8	7.0
DOE Guidelines		**35**	--[b]

[a]All results include background readings for the Ottawa Lake region.
[b]Less than 100 mrem/yr.

Toledo, Ohio, Site Map



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